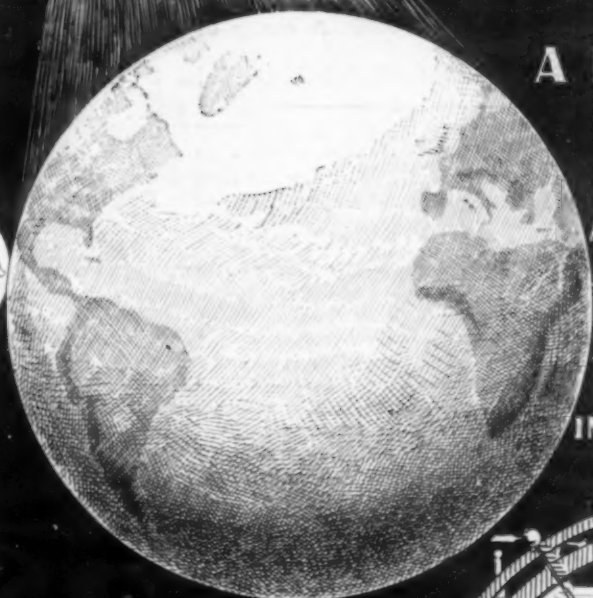
VOL. 2. No. 2. FEBRUARY, 1898.

THE AMERICAN X-RAY JOURNAL



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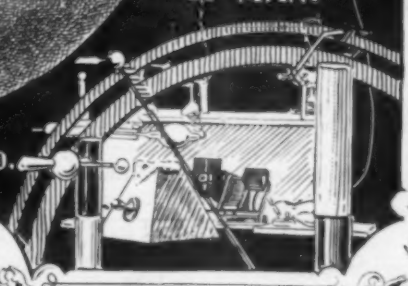

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THE AMERICAN
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Devoted to Practical X-Ray Work and Allied Arts and Sciences.

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THE December issue of THE AMERICAN X RAY JOURNAL completed the first volume of the first journal ever published in the United States in the interest of x-rays and radiant matter. A loose folder of skiagrams with explanatory notes had been printed, and the same is now continued under the title of "Archives of Clinical Skiagraphy" as the official organ of the Roentgen Council of London. A most worthy magazine known as the "Skiagram" is also published in London by members of this learned Council. Nothing, however, approaching x-ray journalism had been printed in this country until the advent of THE AMERICAN X-RAY JOURNAL.

Those who are fortunate enough to own all the numbers of '97 issue can congratulate themselves upon having the first literature upon this all-absorbing subject. As time goes on the first numbers will enhance in value and their worth as pages for reference and as a souvenir can be appreciated.

We can see now how we might have made the first pages more valuable than they are, but the opacity of foresight and the luminosity of afterthought find no exception in new publications. We have done the best we could under the circumstances. The JOURNAL is a success. Medical journals, scientific publications and lay papers throughout the land have given praise and encouragement to the enterprise—more than we deserved. But they were issued in the spirit of true journalism, the rightful effort to encourage a publication which every physician who would be informed should have. Certainly we do feel that taking into consideration our many shortcomings, the life we have was nurtured by the great medical and scientific press of this country and in acknowledging gratitude we shall hope in the future to compensate them by raising the plane of the JOURNAL to what it should be.

The increased demand for space has required us to add 16 more pages to the JOURNAL. We shall continue to print upon this beautiful coated paper of 80-lb. weight.

In the review on pages 192-3 of the first volume of six issues of THE AMERICAN X-RAY JOURNAL, it is found that 123 subjects have been written upon; 50 cuts,

mostly half tones, have assisted in exemplifying the subjects, all of which occupy 155 pages; 20 physicians and scientists have contributed original literature and 50 business houses, including one from the Pacific Coast, have liberally patronized these pages.

Subscribers have come in from all over the world. It is interesting to know that we have paid subscribers from England, Germany, France, Russia, Belgium, Turkey, Friendly Islands South Seas, Cuba, Mexico, and South America. It is a great satisfaction to know that the JOURNAL is appreciated everywhere in this countrv a fact proven by the subscriptions received daily from nearly every state and territory of the United States.

ORTHOGRAPHY.

We have been so many times embarrassed with so-called "typographical errors" which have heretofore crept into the JOURNAL that the feeling has ripened into this opinion: While it is of no particular credit to any one to spell correctly it is a disgrace to spell incorrectly.

Typographical errors in speliing must hereafter cease.

Including this issue of the JOURNAL *and all subsequent issues until the June number we will give one year's subscription free to each of the first two persons calling our attention to any misspelled word or words either in the reading matter or advertisements—excluding proper names.*

NONE TOO SOON.—A great abuse to the medical profession is about to be abated in Washington. Representative Powers of Vermont has introduced into the House of Representatives a bill to fix telephone rates in the District at $25 a year for private telephones, and $35 a year for business houses. At the present time the rate is $72 if paid in advance, otherwise $82, and physicians must pay ten cents extra to telephone to their own homes for any purpose.—*North American Medical Review.*

The Washington system is simply one of "hold 'em up." In December last we entered the drug store of the Shorham Hotel and asked permission to use their phone which was politely given. After ringing the bell and called out the number, an indistinguishable voice was heard and thinking that it was myself also that was not understood I repeated the number. Again came sharply the same voice when the druggist relieved my embarrassment by calling my attention to a slot in the box, on the margin of which was written, "Ten Cents." I dropped the dime with much satisfaction and feeling very thankful for the cheap service, repeated to central again the same number and the answer promptly came in measured tones, "The phone has been removed from that house." I looked at that slot in the box and then turned about to see if I was observed. I purchased a cigar and took time to light it, and wafting gently a little smoke to conceal my color, left the place.

ANAESTHETIC PROPERTIES OF X-RAYS.

Surgeons in this city who have made use of the x-rays for diagnostic purposes have reported a condition of anaesthesia in and about the parts after they had been examined. Drs. Schmidt and Koller observed this in patients operated upon in their private hospital. The patients would invariably speak of feeling less sore on the following day and after the operation. It appeared also that the patients were improved. Dr. Krebbs has also noticed that pain due to chronic lung disease would subside after the use of the x-rays.

This anaesthetic condition was noticed by Tesla who caused a continuous impact of the rays upon the human system. He noticed a tendency to sleep was induced and a benumbed condition of the faculties. The parts he observed felt warm and the effect was of a soothing nature. Edison noticed this same phe-

nomenon and also reported that the eyes felt fatigued and later that objects could be more easily distinguished. Roentgen mentioned that the eyes were not affected, but he was working at the time with an apparatus that did not cast the rays beyond seven feet while Tesla's traveled forty to fifty feet. Tesla's late suggestion that the particular phenomena produced by the x-rays may be due to heat of the material particles thrown out from the tube does not seem possible unless the prism is in this case reversed. Heat rays and light rays of low refrangibility have great penetrating power, but do not impress a photographic plate unless of a higher refrangibility than red.

INTERNAL VACUUM.

The discharge a tube, containing radiant matter only, is said to have a variability of vacuum induced by the electric current. This notion is taught and sent out by makers of x-ray apparatus to prospective purchasers.

Experiments conducted by Lenard in 1894 showed that the lowering and raising of the vacuum in a Crookes tube was easily accomplished with caustic potash which had been employed to absorb the last trace of moisture and carbonic gas. When the vacuum was too high in the tube the application of moderate heat was sufficient to alter the density to a point of allowing the current to pass and cause phosphorescence in the glass tube.

Prof. W. C. Peckham in the *Electric World*, May 30, 1896, believed that if the vibrations of the tube can not keep time with those of its coil few or no x-rays will be given off. He says: "The discharge tube is a resonator for its coil and when the coil and tube are properly attuned the maximum effect is obtained." It does not appear possible that rarefaction of gasses in a tube could take place under the influence of an electric current otherwise a tube would exhaust itself without a pump. Monell says in "Manual of Static Elictricity and X-Ray Uses": "What takes place is some rearrangement of the atoms and ions in relation with the electrodes." During the passage of the electric current polarization of the electrodes is constantly taking place within the tube. "We do not raise the so-called high vacuum but I believe that the bombardment of an opposite polarity releases the interfering ions, shakes loose the particles around the electrodes, permits a normal rearrangement of them, and to express it in simple phrase 'clears the atmosphere'". Rest has the effect also of restoring a tube to efficiency when the vacuum is said to be too high. This strange occurrence Monell likens to the cutting edge of a razor which will come again when laid aside after fruitless efforts with the strop.

A dry temperature of 400 or 500 degrees or boiling in oil or heating the tube with a lamp will restore its efficiency. It appears reasonable that when the atomic particles of radiant matter are electrified and are impacted against tne inner walls of the tube that they discharge or impart with their magnetic properties which radiate into space in some form of actinic matter. The particles are charged and re-charged with swift succession until polarization occurs in them when they cease to be affected. Time, heat and reversal of current will temporarily restore them. Their properties can not be wholly restored nor can these particles be entirely removed, for their inherent property is injured or become diamagnetic and are thrust into the mechanism of the tube.

RUSSIAN DOCTORS.—Russian Doctors wear, as a sign that they are legally qualified to practice, a little zuak, or badge, a silver oval plate, one and one-half inches long by an inch wide.

BURNS AND TECHNIQUE IN X-RAY WORK.

BY S. H. MONELL, M. D.,
Founder and Chief Instructor of the Brooklyn Post-Graduate School of Clinical Electro-Therapeutics and Roentgen Photography; Fellow of the New York Academy of Medicine.

Theoretically, the subject of so-called x-ray burns reminds one of Banquo's ghost; *practically* the subject contains about as much living interest to the well equipped x-ray operator of to-day as the once much discussed question of "Railroad Spine" does to the rider of a '98 bicycle. When the "boneshaker" was extant, *vibration* was an issue, but the pneumatic tire has buried it. When operators were working in the dark and striving to compensate for the deficiencies of poor tubes, feeble apparatus, and unskilled technique, by long exposures, close proximity to the tube and an excess of current, we had a number of reports of x-ray injuries which now possess an historical interest only. With improved tubes and apparatus safety is simply a question of skilled technique, and it is reasonable to say that from this time forward we should never hear of x-ray injuries again.

I believe that continued agitation of this subject hurts a good cause, and does not advance the science. It is difficult to see any reason for continued speculations which lead nowhere and prove nothing; but since so many physicians find articles in current journals which confuse them I have been asked to set them right.

X-rays have been reported to cause a loss of hair, dermatitis, ulcerations of the skin, and a few deeper injuries. The AMERICAN X-RAY JOURNAL of August, 1897, published the number of these injuries reported during the first eighteen months of experimental work, and the total number was sixty-nine. Four of these were a mistake. Twenty-three were professional x-ray exhibitors who exposed their hands in close proximity to the tube for four or more hours per day, for weeks and months at a time, before they succeeded in getting hurt. Out of the countless thousands of other persons who have been made the subjects of x-ray examinations, but forty-two had bad effects. Most of these happened during the earliest days. Probably a million x-ray pictures have been taken altogether; probably a thousand experimenters are now daily exposing themselves to x-rays; yet despite these facts, practically no one suffers. If x-rays burn, would not cases be numbered by thousands instead of a few dozen? "Idiosyncrasy" does not explain this.

But it does not make any real matter whether x-rays *can* burn or not, for experience demonstrates three reassuring facts:

1. It is easy to see how every one of the sixty-nine injuries reported could have been *avoided*.

2. It is *easy* to avoid injury during x-ray work.

3. It is *difficult* to cause injury during x-ray work.

It is easy and safe to walk down stairs, but if a man breaks his neck by throwing himself down, the stairs are not to blame. Let us now consider a few practical points:

The *Journal of Electro-therapeutics* for January, 1898, contains an article entitled, "The x-ray and the so-called Burns." With the author's kind permission I will use a few of his remarks for my text, assuring him that I do so in a friendly spirit. Says Dr. Jenkins: "So much for the ray itself, with all its wonderful and alarming results." What alarming results?

"That these rays do produce burns there can be no doubt". Why can there be no doubt? What *proof* has *ever been advanced* that x-rays burn? I have paid some attention to the matter and I challenge any one to

produce a demonstration of dermatitis produced by *x-rays*. On the contrary the accumulation of proof points the other way.

Again, the article to which I refer, remarks: "Dr. Monell, of Brooklyn, advances the theory that the so-called burns are not due to the tubes or rays at all, but to the direct contact of the electricity." ***** "There may be some truth in what Dr. Monell says, but it offers no argument in proof that the atomic force of the ray combined with the platinum does not produce the so-called x-ray burns."

I do not exactly understand what is meant by "the atomic force of the ray combined with the platinum," but I presume that Dr. Jenkins could demonstrate the "proof" to which he refers, or otherwise he would not offer the remark as proof that my statement is wrong. Confessing, however, my ignorance of "the atomic force of the ray combined with the platinum," I must say that I do not recognize the above quoted "theory" as a verbatim extract from anything I have ever written. I have examined my Manual of Static Electricity in X-ray and Therapeutic Uses, and some half dozen of my published articles about x-rays, without finding the words mentioned.

An instant later Dr. Jenkins further remarks: "***** indicates that Dr. Monell is evidently wrong in his theory, and that he will not only have to change his opinion as to the cause of burns, but retract his statements about static machines, for if the ray is the cause it makes no difference how the current is produced."

If any operator will kindly come to my office and take charge of my x-ray apparatus for a couple of hours and show me that I am mistaken in the views which experience with my apparatus teaches me to believe correct, I will retract every error of the past and welcome the new truth. Physicians, however, who have come to me for instruction during the past year and a half, and have seen the actual work on which my writings are based, will perhaps be inclined to the opinion that the demonstration might require considerable skill in technique. I am, however, not only willing to be convinced, but am continually seeking new information.

I shall now use the above text to repeat the substance of my teachings on the points noted, and I need not fortify myself by new arguments, for on Oct. 2, 1897, I replied to other inaccurate and similar charges in a manner which requires no alteration now.

"Several correspondents write me that they understand me to claim that the static current does not cause a burn, and go on to notify me of a case reported. My experience demonstrates that with proper management the *direct* static current tends so little to cause injurious action upon the skin that it is easy to avoid all trouble, even when working continuously with tubes for several hours. I have, however, seen evidence that by condensing the current through Leyden jars, and by non-expert methods of employing tubes which really abuse the apparatus even without condensers, and by persisting for a long time, a dermatitis can be set up.

"To set forth my early and present position in regard to static burns it may be best to quote from what I have previously written:

"While there is no mechanical device which can not be abused, yet if any physician with a Holtz machine and one of the author's tubes would start out in the morning with the deliberate purpose of inflicting upon himself a 'dermatitis Roentgeni,' by nightfall of a long summer's day he would be baffled in the attempt if he employed the proper method. The direct static discharge of high potential and infinitely small amperage does not produce electrolytic or chemi-

cal effects upon the human tissues without x-rays and consequently does not produce such effects in conjunction with x-rays."

If the current is transformed by condensers, or backed up by the resistance of a high vacuum tube, and if a powerful spark interruption is maintained, the current is *altered* and my statements above quoted do not apply to the condition. Every one who uses a static machine certainly knows that by the use of a covered electrode vesication can be caused by a static application, but this ancient fact does not make a sedative breeze vesicate. The term "proper method," must define the scope of my assertion that the static current is safe, for it certainly does no harm ordinarily, and must be used under altered conditions to cause dermatitis. As proof of this there comes to my notice the experience of an x-ray exhibitor whose hand is now inflamed to a moderate degree. He tells me that during a special exhibit he exposed the back of his hand at close range, often in contact with the bulb, for a total of twenty hours divided between two days. The current was pushed to its utmost. There were but two tubes employed, one being kept going constantly for six hours. They were the "Monell Static Tubes" and remained in working order despite this severe use. In about ten days a dermatatis appeared, but has not proved to be very severe. A powerful spark was used and the hand was often in actual contact with the bulb. This bears out all my assertions about the slight liability of this form of current to do damage in x-ray work. The operator was sufficiently skilled in handling tubes, but was not familiar enough with static apparatus to *regulate the current* and avoid an excess. Had this been done he would have been able to keep his hand free from injury, especially if he had used reasonable caution as to distance. He, however, had a firm belief—not correctly understood—that it was impossible by *any* use of static electricity to cause an inflammation of the skin. Had he not been so convinced of this by his previous immunity while exhibiting for several months, often subjecting his hand to long exposures—once as long as six hours without harm—he would have been more careful. So rarely is an injury caused by operators using static machines correctly that alarm may be dismissed from patients' minds."

I stand by every word of the above statement, written six months ago. Time has not impaired its accuracy, nor subjected it to change; and now let us state a few operative details.

We place a tube in its standard upon a table, connect its terminals with the prime conductors of any large therapeutic static machine, and start it into action. If the tube operates perfectly by the *convective* discharge of the direct current we observe no noise, no heating of the tube beyond about blood heat, and no spray about the external surface. If the palm is folded around the bulb no sensation except the slight warmth is felt.

All the current is now going around the circuit within the tube and there is nothing outside the tube to cause a burn. It is my belief that a tube operated in this way can not cause a so-called x-ray burn, but perhaps I had better say that it has never done so in the severest tests that time has permitted me to make. Even if an exposure was continued for a week without interruption such a tube would apparently not injure a patient because no discharges except those of a harmless nature take place outside the bulb. The x-rays penetrate readily enough, but x-ravs do not burn or ulcerate any tissues through which they pass.

Now let us put a pair of interrupters on the sliding poles of this giant machine, and regulate the intensity of the bom-

bardment to suit the given tube. If the internal resistance does not exceed the resistance of two inches or less of ordinary air the current in this case will also discharge within the tube and no overflow will sputter and fly across the terminals around the external surface. Exposures of any length of time may be made with this tube with absolute safety at any distance from the tube, whether six inches, twenty inches, or one inch, so long as the patient does not feel upon the surface of the exposed skin the familiar sensation of the static spray.

But suppose the resistance of the vacuum increases during use, or is higher than stated above. Let us consider that it equals the resistance of three and a half inches of air gap; and across the space between the internal electrodes the current will only jump under the pressure of a tremendous bombardment. In fact all the current will not discharge itself within the tube, but backs up and makes a luminous brush along the positive wire, and sputters in a visible spray discharge upon the outer surface of the tube. If the hand is placed within the radius of this external electrical discharge it will be subjected to the action of the same needle-like shower upon the skin which is familiar to every patient who, upon the static platform, has received a negative spray through resisting garments. If this bombardment upon the skin is maintained long enough it will set up a dermatitis, but it will take some time to do it. To avoid the possibility of a dermatitis we need not seek an "aluminum screen," or send a cry for help to distinguished electrical inventors. The spray acts injuriously only through resistances and only when the object is within the short radius of its bombardment. We can either move the tube a few inches further away and escape danger altogether, or we can dispose of the resistance of the dry or cloth-covered skin by removing the clothing over the part, and moistening the skin a little, just as we moisten it in the direct application of a galvanic or faradic current. The most rudimentary experience in actual electro-therapeutics divests the whole subject of x-ray burns of all the practical interest which has been supposed to belong to it. Any therapeutist can demonstrate the actions upon the skin of different therapeutic currents and can show how to prepare the contact so as to avoid irritation while securing proper effects.

No operator with well instructed skill would place a tube from which an external spray sputtered, so near the patient that the electrical bombardment would irritate, for the brilliant radiance produced by such a tube would make it unnecessary in the first place, and in the second place the operator would know better.

Having command of a tube of high efficiency the physician can regulate the distance between the patient and the tube to suit his own judgment, and if his judgment is good his patients will be as safe as an infant slumbering in its cradle. Even if the vacuum of an exceptional tube may at first compel the use of an excess of current, as I have stated above, yet in a few moments it will be possible to regulate the current so as to control in a large measure the external spray, and this regulation will also remove the possible cause of complaint. This is solely a question of *technique*, and in its practical bearing upon the physician's work calls for no scientific speculation, or profound experiments from the laboratory of the physicist. It is, I say, a question of technique, and not of vague speculations, and so important is technique in all the work of the physician with Crookes' Tubes that a few notes of some of its relations to results may interest the reader of this article.

Instead of reciting imaginary condi-

tions I will report, in synopsis, a little of last evening's work.

Present, Dr. W—, of Rochester, N. Y., an operator with considerable previous experience but who desired further instruction in securing maximum effects. In one, two, three order, about ten tubes were rapidly tested, the value of the vacuum resistance of each tube practically measured, the working x-ray value of each tube instantly determined and the luminous manifestations of each shown to be the language by which to interpret its condition.

The tubes tested varied in size from the smallest x-ray tube I have ever seen, its bulb being about the size of an English walnut, up to tubes eighteen inches in circumference. The internal resistance varied in different tubes from the low vacuum of a sixteenth of an inch of a resistance, up to full three inches, and the measure of the resistance of each tube accurately informed us of its efficiency for x-ray work.

Having completed instruction in thus ascertaining the value of any given tube we next took in hand a tube of low vacuum to demonstrate the method of raising the internal resistance to a working point. A tube, twelve inches between the terminals, with a bulb five inches long and thirteen inches in diameter, possessed so low a vacuum that the discharge between the electrodes was a direct stream like a pencil, bluish near the cathode and somewhat pink near the platinum reflector. The resistance equalled only about one-sixteenth inch of air gap between the sliding poles of the apparatus. I asked Dr. W— what he would do with such a tube in his own office. He replied that he would throw it away, considering it impossible to make any use of it. "However," said he, "you teach that by reversing a tube you can raise its vacuum; I would reverse it and see if that would do any good." Permitting Dr. W—— to assume charge of the tube, it was reversed and the current again started.

How long should it be kept reversed? Until the blue disappears and as much green as possible is developed in the phosphorescence. In about five minutes I stopped the machine to permit Dr. W—— to test the result of his work. The tube was the same as before reversal, and not improved in the slightest degree. It gave out no x-rays, as a blue stream between the electrodes is not the high potential bombardment which is required to produce x-rays. The suggestion to "reverse the tube" was, however, all right, and the result is a question of technique. Taking the tube in hand in a different manner it required less than three minutes to demonstrate with it a bright green luminosity and x-rays as good as the average operator throughout the country is obtaining with his best tubes to-day. So much for raising a low vacuum.

A tube with more than three inches resistance and of a larger size was next connected with the machine. The current backed up along the positive wire and flared out of the terminals of the tube. The resistance was just high enough to prevent immediate action and in former days the alcohol lamp would have been brought into service to heat it. By re-enforcing the strenuous pressure of the current with the sharp blow of a sudden "break and make" the tube instantly glowed with bright green and gave out superb x-rays. In a case of still higher resistance the use of tin foil around the terminals, as I have described on page 621 of the second edition of my book, is perfectly successful.

Next in order followed a demonstration of tests of the comparative value of x-ray efficiency in different tubes, or in the same tube at different times, and working under a different dosage. With the fluoroscope, and depending on the

eye and observation of the bones of the hand alone, a non-expert may think two tubes of equal value when one is several times as efficient as the other. This is important in regulating the exposure time in photographic work. A simple test exactly measures the values. Adjusting different tubes with different dosages of the current, beginning with a very low current, I took Dr. W—— along a succession of steps of x-ray penetration as follows: 1. The hand cast only a black shadow on the fluoroscope. 2. The bones of the hand appeared lighter. 3 The bones of the hand became very transparent. 4. The bones were almost of the same transparency as the soft parts. 5. The metallic objects on the back of a strip of pine were plainly visible through a Webster's Unabridged Dictionary. 6. Wrist, elbow, shoulder, ankle, and knee were transparent. 7. A watch was held upon the left side of my head and was visible wherever moved, the fluoroscope being placed against the right side of the head. 8. Dr. W—— obtained the best view of the author's heart at about thirty inches from the tube. 9. Through all parts of the body of men aged over forty the rays penetrated with brilliant light, and with definition according to the part. 10. When the fluoroscope was held over the region of the pelvis and hip joint it was brilliantly lighted up, and coin in a purse in the subject's pocket, the suspender buttons, the drooping links of a watch chain, the watch in the lower vest pocket, and the outline of the head of the femur were visible. The transparency of the bones of the thick pelvis of a large man aged about forty-five was fully equal to the ordinary transparency of the hand with ordinary apparatus, and the sharpness of the metallic objects was as well defined as ordinarily through the simple resistance of a book. 12. The x-radiance produced by this tube was shown to render objects as transparent ten feet away as at ten inches with many common tubes.

To demonstrate facility in operation and the comfort of the operator, it was shown that no puttering was required to produce the different desired effects with any of the different tubes manipulated. It was also shown that while working in front of the tube the operator has no care on his mind; he practically ignores the machine after having once adjusted it, and whether ten minutes, or an hour, or two hours, goes by, there is no occasion to stop the current, rest the tube, or cool it off; there is no great amount of noise, and no disturbance of any kind to distract the operator or make the patient nervous.

These results are simply a question of technique. I demonstrate them over and over again. I can repeat them at any and all times. There is no reason why every operator in the country should not command an equally certain technique. I teach the operator to understand exactly what he is doing and what the tube is doing, in a practical sense. I have little knowledge of the kind that eminent physicists bring to bear upon the consideration of x-ray phenomena, but I know how to *make a tube work* and teach others to do the same. It is unsatisfactory to do x-ray work when the operator is obliged to fuss and putter with his tubes, sometimes for half an hour, before an examination can be made. Operating by guess work, with no clear idea of the meaning of any of the actions of the tube or current, and continually troubled by perplexities as to the best means of proceeding is unsatisfactory. It is unsatisfactory to do x-ray work when the operator lacks the guidance of comparative tests to inform him exactly what his tube is doing; whether it is doing its best, or could be made to do better, or how it compares in efficiency with the maximum now known

A knowledge of correct technique ends

all this uncertainty and removes dissatisfaction from the manipulation of a Crookes tube. "Technique" is the jockey in the saddle that drives the electrical current to a finish, commands the most balky tube, points its head in the right direction, and spurs it into brilliant action with neither hesitation nor swerving to the right or left.

With skilled technique the question of x-ray burns becomes as obsolete as the customs of the Aztecs. It really matters not what has caused the burns of the past, for there certainly need be none of them in the future. Among abundant evidence, however, that the burn has never been due to the x-ray I think the experiment of Elihu Thompson last spring supports, by the weight of a direct experiment, the common observation of all competent x-ray workers. In setting up a dermatitis on his own hand he produced no effect where the skin was covered with lead and tin foil. Tin foil did not prevent the x-rays passing through his hand anymore than a sheet of paper would prevent them, but the tin foil prevented the burn, during an exposure at the extraordinary small distance of five-eighths of an inch from the platinum reflector. It is to my mind absolutely certain that the x-ray does not inflame a tissue through which it passes; but nothing is more certain than that a sufficiently energetic electric current passing to tissues which it can reach and enter only after electrical energy has been transformed into heat by resistances such as dry and hair-covered skin, or clothing, will vesicate, and can be made to produce intenser and deeper inflammatory action by the technique of a competent electro-therapeutist. Competent technique can also *avoid* these effects at will. Those who study electrical phenomena along the lines of engineering and metallic conductors should take into account the vastly different experience of therapeutists who employ electrical currents upon and within human tissues. Many of the matters discussed by electricians in a perplexed and puzzled manner during the past two years of x-ray work have dealt with the rudimentary and long established facts of electro-physiology and electro-therapeutics as if they were unknown. It would have been well for the best interests of practical x-ray work if some of the discussion had first waited to read the A B C's of electro-physiology.

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THE origin of the word "deadhead" is explained as follows: Fifty years ago the principal avenue of Detroit, Mich., passed close to the entrance of the plank-road leading to Elmwood Cemetery. As this cemetery had been laid out some time previous to the construction of the road, it was arranged that all funeral processions should be allowed to pass along the latter toll free. One day, as Dr. Pierce, a well-known physician, stopped to pay his toll, he observed to the gatekeeper: "Considering the benevolent character of our profession, I think you ought to let us pass free of charge." "No, no, Doctor," replied the gatekeeper, "we can't afford that. You send too many deadheads through here as it is." The story traveled around the country, and the word "deadhead" was eventually applied to those who obtained free admission to the theatre.

KITES sent up on Oct. 15, from the Blue Hill Observatory, surpassed the record of Sept. 19 by more than 1500 feet. They carried the meteorological instruments to a height of 10,900 feet above the hill top, or 11,500 feet above sea level. The kites were sent up at 3.50 o'clock in the afternoon and reached the highest point at six oclock

At that altitude the temperature was forty-three degrees, while it was seventy three degrees at the ground, showing as much difference as one might expect.

THE ROENTGEN RAY WAVE LENGTH DEPENDS UPON THE POTENTIAL.

BY WILLIAM ROLLINS.

When we try to see what goes on in a vacuum tube, looking at it "with that inward eye which is the bliss of solitude," the Roentgen rays appear to differ only in degree, and to be dependent for their penetrating power upon the potential of the current and the degree of the vacuum in which the cathode discharge takes place.

We should bear these probabilities in mind in the practical application of the rays to medical diagnosis, arranging the potential so as to make rays of the proper length for our purpose.

If we wish to see the outlines of the bones of the hand distinctly, we shall keep the potential low, to make the contrast with the soft tissues great, while if the bones are more deeply seated we should not use a tube with a higher vacuum to send the rays through a greater thickness of tissue, but we should keep the potential and vacuum the same to prevent altering the wave length, and increase the light by making more impacts upon the target from the cathode discharge.

Suppose we take a tube with the lowest vacuum in which we can generate any considerable number of Roentgen rays. In this tube the anode must be cooled and the cathode movable. The tube should have a potash bulb, as used by Crookes, to quickly lower the vacuum or raise it again. The curvature of the concave cathode is to be that of a sphere of two inches diameter. A spherical curvature is not the best; but, as Kipling says, "that is another story."

With a very low vacuum we can generate Roentgen rays with the anode nearly in the center of curvature, or a little over one inch from the cathode, and yet have good definition if we have taken care in grinding the concave surface. Then, if we look through a hand, the bones seem very dark, because of the contrast with the softer tissues. If, now, with the same potential, we increase the number of impacts upon the anode target from the cathode discharge, we make both bones and tissues lighter without much changing the relative values.

If we raise the potential and the vacuum, focussing the cathode stream on the target again, we shall find as previously stated in these notes, that the distance between the cathode and anode is increased, while the bones are, relatively, more transparent. Every time we do this with higher potentials and vacuums, the relative capacities of two substances are changed; and we could go on building more powerful apparatus until we could make rays to which all the so-called elements would be as transparent as glass to light. Platinum being then permeable, we could, for some of our work, abandon internal cooled reflecting anodes and use a form of tube employed in some of my experiments, the platinum, in the form of a disk, being sealed into the wall of the tube, corresponding somewhat to Lenard's aluminum window. Then, by using higher potentials and cooling both terminals, we could approximate to that vibration to which the worlds are transparent.—*Electrical Review.*

EFFORTS have been made, and are likely to be consummated, for mutual affiliation with the University of Chicago and Rush Medical College. The second stipulation provide "that the requirements to admission to the college shall gradually be increased until the Autumn of 1902 when those only will be admitted who have completed the freshmen and sophomore years of regular college work."

A NOTABLE X-RAY OPERATION WITH DENNIS' FLUOROMETER.

BY JOHN DENNIS.

Late in the month of November, 1897, Mr. B. was brought from Northeastern New York to the Hahnemann Hospital at Rochester. Over thirty years before he had received a charge of squirrel shot in the right leg, midway between the knee and ankle. Some of the shot had, at two different times, been removed, but such was the condition of the limb that it was determined by his home surgeons that an attempt should be made to remove the matter by means of the Roentgen rays.

The day after the patient arrived at the hospital the limb was brought within the influence of the Roentgen rays and measurements made by means of the Dennis Fluorometer. The first observation was made from the side, the cross section view of the limb being secured in about the center of the group of foreign matter which was revealed by the superficial view. A position satisfactory to the surgeons having been obtained, a Fluorograph was taken. It will be seen by examination of the Fluorograph (Fig. 1.) that the foreign matter was considerably scattered.

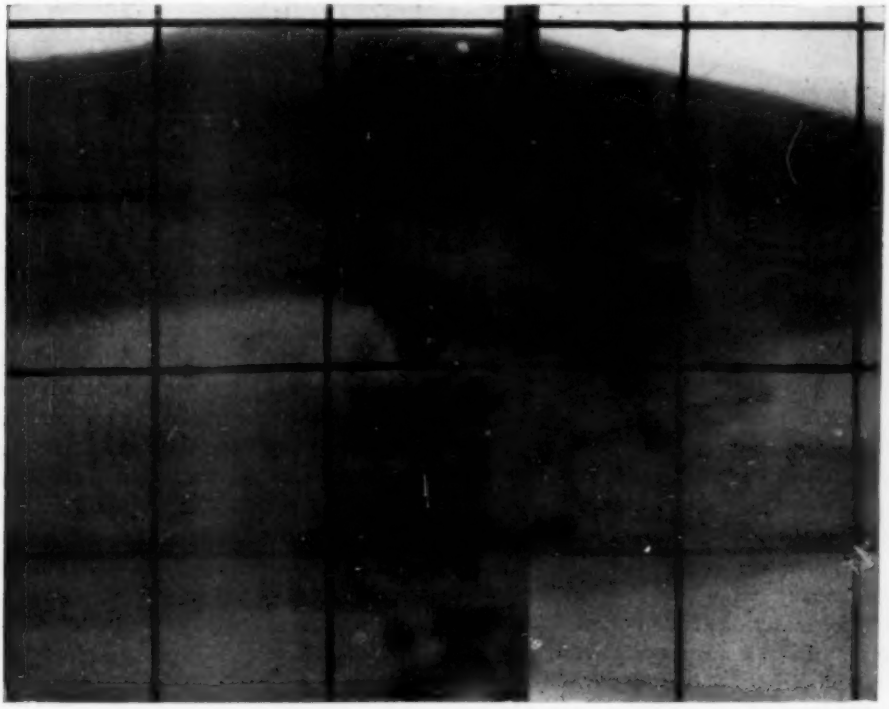

FIG. 1

An observation was next made from beneath the limb, it remaining in the same position as before. It was found that the shot were practically in a line, which extended about one inch above the cross formed by the Fluorometer, and about two inches below the line of the cross section that is up and down the limb. The forked sights were then placed in position, and the divergence or obliquity of the rays eliminated, thus

showing the exact position of what may be called the "layer" of shot.

It was upon this observation, which was later followed by operation, that the diagnosis was based, and it is perhaps of sufficient interest to warrant a more detailed description. After the first observation at the side a line of India ink had been drawn around the limb marking the cross-section which had been produced by the Fluorometer practically in a thin layer, the edge of which layer was toward the observer. One of the forked sights was then placed on the Fluorometer arm nearest the observer, and thus nearer the screen of the Fluoroscope, in such position that the layer of shot intersected the notch of the sight and about midway of its length; that is up and down the limb. On the upper arm of the Fluorometer nearest the tube (now the crosspiece) was placed

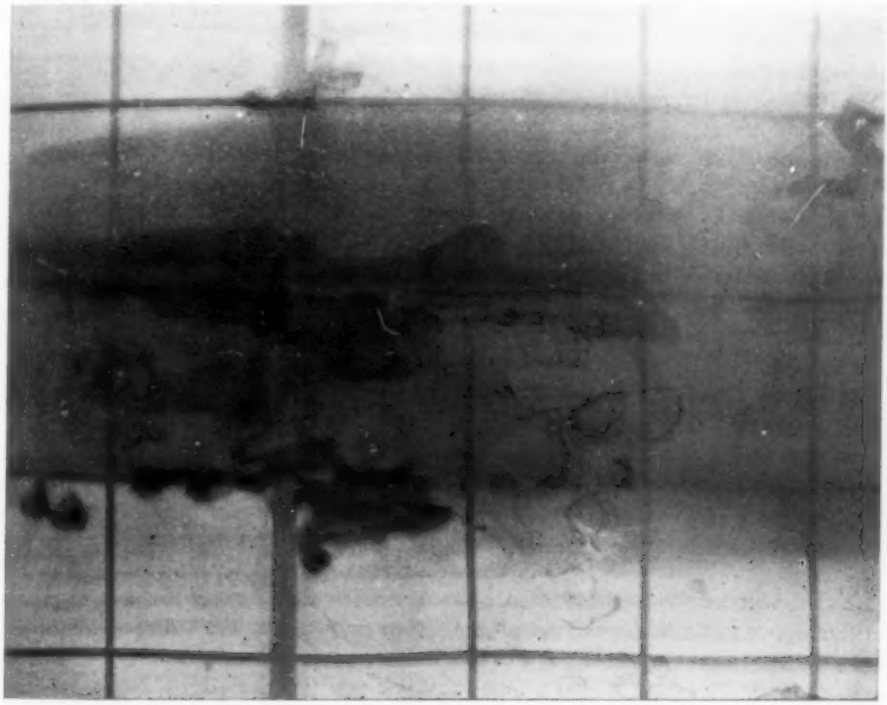

FIG. II.

appliance. A cross-piece was next placed over the upright arms of the Fluorometer for maintaining the cross sectional view during the second observation and the tube was placed above the limb, instead of at the side as before, the observer with the Fluoroscope placing himself beneath the table. The first observation from this second view-point, was of course for the purpose of finding the shot, and they were, as has been said, a second forked sight, at a point equally distant with the first from the left side of the Fluorometer. The tube was then shifted until the grooves of the sights coincided; in other words, until a straight ray passed through both. It was then noted by means of the metallic grating, which had been placed on the level of the top of the table under the Fluorometer, that the layer of shot appeared about one-half inch to the left of the right line

through the two forked sights. The sights were then moved one-half inch to the left, both being moved the same distance. The tube was again shifted slightly until the straight ray was through the notch of the upper sight, through about the center of the layer of shot, and through the notch of the lower sight, thus bringing the three in line, so that a coincident shadow was thrown on the screen of the Fluoroscope.

All that now remained was to draw a line in India ink on the upper surface of the limb, corresponding in position with the notch of the upper sight, and to draw a similar line on the under portion or calf of the limb, corresponding with the notch of the lower sight. When thus corrected by the Fluorometer, this line was two and three-fourths inches long, and of course ran at right angles with the line which marked the cross-section of the limb. The sights were then removed and another Fluorograph, (shown in Fig. 2) was taken, as a matter of record.

A few days later the patient was placed under the influence of anaesthetics, and the operation for the removal of the shot performed, the India ink markings on the limb being relied upon as a guide to the surgeon. At the very first incision, made in careful conformity to the lines which intersected the cross-section line on the upper and lower portions of the limb, the scalpel encountered three of the shot, showing the geometrical accuracy of the diagnosis. These three shot were removed and fourteen others, mostly imbedded in the bone, were found on the line between the two and three-quarter inch Fluorometric markings, above and below. It will be seen that the Fluorograph (Fig. 2)places this line of shot apparently three inches from the left side of the Fluorometer appliance. As seen by direct examination of the limb while in the Fluorometer appliance the indication lines were a fraction less than two and three-quarter inches from the outside of the Fluorometer appliance. This difference (in this case something over one-fourth of one inch) represents the divergence or obliquity of the rays between the uppermost shot and the sensitive plate. In other words; had the incision been made three inches from the square edge of the Fluorometer appliance as indicated in the picture, the scalpel would have gone astray a trifle over one-fourth of an inch, with the distortion of the ray corrected, in the manner which has been described, as has been said, the first incision of the scalpel resulted in its encountering three of the shot.

The Fluorometer is so constructed that the effect of the distortion caused by the obliquity of the rays is ascertainable in each and every case.

DEEP BREATHING.

In an excellent little work entitled "Deep Breathing," edited by Dr. M. L. Holbrook, the author, Sophia Marquise A. Ciccolina, sets forth her method of developing lung power, and so promoting the physical health.

Her method is, briefly, to breathe from the abdomen entirely; so exhale by compression of the muscles overlying the stomach, and to inhale by expansion or inflation of the stomach. The ribs are motionless during the acts of inhalation and exhalation. The inhalation is slow and deep, and the air is to be held for a few seconds after a little practice; is forced into the upper chest by contracting the abdomen, drawing back into the abdomen by expansion of the stomach, and finally exhaled rapidly. According to the author, this rapid exhalation has the effect of actually expanding the chest, and the whole process, if practiced for an hour each morning, and persevered in until it becomes second nature, tends to cure nervousness, consumption, hysteria, and many allied pathological conditions.—*Journal of Life and Health.*

X-RAYS AND ABNORMAL PHENOMENA.

EDITOR AMERICAN X-RAY JOURNAL.

After reading in the November number of your excellent journal the remarkable results reported by Dr. Astudillo, of Havana, Cuba, in the use of the x-rays with the blind, I am constrained to write you of a peculiar experience which I had with a blind man a short time ago.

There is a blind man here, who tunes pianos for a living, who goes all over the city alone. He is about thirty years of age, and began to get blind when he was a boy, after an acute disease of some sort, I have forgotten what now, but that is immaterial.

After going to many oculists, he became totally blind, except to very bright light, about four years ago. He can now tell when he faces a window, or a match is moved before him, and he lights his own cigars. There is a total opacity of the right cornea and but a thread of dark color about the circumference of the left cornea, which is otherwise entirely opaque.

He came to my sanitarium at my request to experiment with the x-rays, as he is well educated and intelligent, having been through the State School for the blind.

I told him of Dr. Astudillos and your experiments with the x-rays, and he was curious to try them himself.

I handed him the tube, to let him feel the shape, and explained the mode of attachment, etc. After he had examined it, he made the remark that that was the first time he had ever seen a Crookes' tube, and that now he knew what it looked like. It is amusing to hear a blind man talk about seeing. He can run my Remington typewriter first-rate, and speaks of seeing the keys, etc.

I purposely refrained from telling him what the color of the tube would be, when it was acting, as I wanted him to tell me if he saw anything. As he once was able to see, when a boy, he knows what colors are.

I attached the tube to my static machine, placing it in the holder, in an upright position in front of him, with the platinum anode on a level with his eyes, and about six inches from his face.

When it was acting well I asked him if he saw anything. He hesitated a minute, and then told me that he saw a blue light, a dark blue light. I asked him if it was violet, and he said yes.

I then told him, the room being dark, that all that I saw was a greenish yellow light, but he said it was bluish to him. After looking steadily at the tube for several minutes, he volunteered the statement that his eyes felt better that the pain and fulness which was there before was better, and later he said that it was gone. I made no suggestions to him, so that there was no psychic or hypnotic treatment attempted. He was pleased with the feeling produced, which I had not thought of before.

I passed my hand between the tube and his eyes, and he could detect the shadow, likewise that of several metal instruments, but he could not tell what they were. He could only tell there was a shadow passing before his vision. In his case the optic nerves are not destroyed, but he is blind on account of the corneal opacities. I might state here in passing that there is a constant and involuntary lateral oscillation of the eyeballs, which he is unable to control by will power. His attention had never been called to this nystagmus before, which he tried to control, at my suggestion, but failed.

We know that at the upper or blue end of the spectrum, there are still further colors, which we are unable to see, which we call the ultra violet rays. There are some eyes which are very sensitive, either naturally, or have been so educated, that they can detect shades of

color beyond the range of ordinary vision.

To the ordinary vision these ultra violet rays of light or color are invisible, and it is supposed that the x-rays are somewhere beyond the violet, out of our sight. But we know they are there.

Is it not probable that in the case of this blind man, whose eyes are blind to ordinary rays, that his vision is so sensitive that he can detect the ultra violet colors, in the x-rays?

We know that when we lose one of our senses, that the other senses are more acute. The sense of touch, and pressure, is highly developed in this man, and he says that he can tell when he is approaching a person or object, before he strikes it, and that if he is not going too fast that he can avoid it, without seeing or touching it. There is a totally blind dog here in town that can go anywhere, and it must be by the sense of smell, and hearing, as he never strikes anything, and he trots fast.

Verily, "there are more strange things in this world, Horatio, than are dreamed of in thy philosophy."

Allow me to quote from an article by the late Prof. G. V. Riley, of Washington, on "The Senses of Insects", published in "Insect Life" Vol. VIII, page 40, in which he says:—

"There is every justification for believing that all the subtle cosmic forces involved in the generation and development of the highest are equally involved in the production and building up of the lowest of organisms, and that the complexing and the compounding and specialization of parts have gone on in every possible and conceivable direction, according to the species. The highly developed and delicate antennae in the male Choronomous, for instance, may be likened to an external brain, it's ramifying fibers corresponding to the highly complicated processes that ramify from the nerve cells in the internal brains of the higher animals, and responding in somewhat similar manner to external impressions. While having no sort of sympathy with the foolish notions that the spiritists proclaim, to edify or terrify the gullible and unscientific. I am just as much out of sympathy with that class of materialistic scientists who refuse to recognize that there may be and are subtle psychical phenomena beyond the reach of present experimental methods. The one class too readily assume supernatural power to explain abnormal phenomena; the other denies the abnormal, because it, likewise, is past our limited understanding."

The same author goes on to quote from an article by William Crookes, entitled "Some Possibilities of Electricity", which appeared in the Fortnightly Review, March, 1892, as follows:—

"The discovery of a received sensitive to one set of wave lengths and silent to others is even now partially accomplished. The human eye is an instance supplied by nature of one which responds to the narrow range of electromagnetic impulses between the three ten-millionths of a millimeter and the eight ten-millionths of a millimeter. It is not improbable that other sentient beings have organs of sense which do not respond to some or to any of the rays to which our eyes are sensitive, but are able to appreciate other vibrations to which we are blind. Such things would practically be living in a different world from our own. Imagine, for instance, what idea we should form from surrounding objects were we endowed with eyes not sensitive to the ordinary rays of light, but sensitive to the vibrations concerned in electric and magnetic phenomena. Glass and crystal would be among the most opaque bodies. Metals would be more or less transparent, and a telegraph wire through the air, would look like a long narrow hole, drilled through an impervious solid body. A

dynamo in active work would resemble a conflagration, while a permanent magnet would realize the dreams of mediaeval mystics and become an everlasting lamp with no expenditure of energy or consumption of fuel. In some parts of the human brain may lurk an organ capable of transmitting and receiving other electrical rays of wave lengths hitherto undetected by instrumental means. These may be instrumental in transmitting thought from one brain to another."

The above words quoted from the inventor of the tube with which we now generate the x-rays, and written long before they were discovered by Roentgen, were they not prophetic, and is not this blind man who can see the ultra light, fulfilment of the prophecy?

Truly we are in the beginning of a wonderful era, and still more wonderful things are to be accomplished, and the AMERICAN X-RAY JOURNAL is going to be of great help towards the advancement of this new science, and I wish you well. Yours Fraternally,

H. C. BENNETT, M.D., M.E.

STORAGE BATTERY APPLICATIONS. CLARK. *West Elec.*, Jan. 1.—A short article on the future of the storage battery business. After enumerating the well-known advantages of storage batteries, he calls attention to their use in the future when storage becomes necessary to utilize the whole of a water power; another opening is in the installation of batteries on the premises of large users, a business which is already being exploited successfully in connection with a station in the East; reliability and endurance are the chief requisites, as distinguished from the reduction of the weight; he thinks there is more than a probability of a profit in storage battery traction as compared with the underground conduit system; train lighting by batteries will be universally used.

BLESSINGS OF BACTERIA.

It is rapidly becoming the opinion of a great many intelligent but unscientific people that the doctors are running this bacteria theory into the ground. If Job had lived in the present generation his apothegm to humanity might have read: "Man that is born of woman is of few days and full of microbes." Under the bacteria theory that everything he eats, everything he drinks, everything he wears, the air that he breathes and the tools that he handles, are infested with deadly germs which have no other function in the economy of nature than to lay him low. It is, therefore, with pleasure that once in a while we encounter a scientist who has discovered some microbes which appear to take the part of man in his battle with ill-health, death and the devil. At a meeting of the Washington Chemistry Society last week President Schweinitz devoted his annual address to those microbes which are at peace with mankind, and we have taken a few sentences at random from this address for presentation below:

"Our ideas of germs are so thoroughly associated with disease that we are prone to forget that many of them are very useful fellow-workers after man has learned how to use them. The value of this cell life in the production of beer, wine and other fermented liquors is too well known to need more than passing notice. But you may not all know to what extent the aroma and flavor of butter and cheese are due to the products of micro-organisms. Now these products are frequently ethers and esters, sometimes acid and acid derivatives or amines, the latter a class of compounds to one of which smoked herring owes its peculiar flavor and which is also formed by a number of bacteria."

This extract alone ought to be sufficient to convince any thoughtful man that President Schweinitz is on the

right track, for the similarity between some kinds of butter and smoked herring is too apparent for dispute. Indeed, one occasionally encounters butter which in flavor resembles the herring that has not been smoked, but which has departed this life from old age and decreptitude. But we are interrupting the scientific gentleman, who proceeds as follows:

"When milk is first collected from healthy animals it is almost free from germs, but exposed to the air it quickly becomes filled with those forms of life which are harmless to man. If placed under suitable conditions they will multiply very rapidly and the milk becomes sour, due to the formation of lactic acid produced from the sugar of the milk by one or more of these germs. If the germs present happen to be those giving an ether and ester which have a pleasant flavor and aroma, good butter may be made, but if they give rise to the formation of disagreeable thio, or some amines, the butter is poor and bad. Now, by isolating different germs in the milk and cultivating them separately, so as to discover their own peculiar product, it is possible to always have good butter of the same sort and flavor by first destroying the other germs present by Pasteurization and then inoculating the cream with the particular germs desired."

If we have followed the Professor intelligently, he proposes to vaccinate butter. The possibilities are too enormous to be rightly appreciated all at one time, but no one can fail to comprehend the pleasure and satisfaction which will follow the ability to pick up a roll of butter at market, and find stamped on the end: "Inoculated by the Anti-Rancid Co., of Podunk," or "Guaranteed to be Vaccinated with Best Microbes That Ever Crawled," or "No Germs Like Ours." The possibilities are too enormous to be absorbed at one sitting, but no one will dispute the proposition that right on the surface it presents the grandest emancipation which has attended the progress of this marvelous century."—*Exchange.*

RADIOGRAPH showing fracture of Styloid Process of left ulnar and bird shot in hand. The thumb was shot off twenty-three years ago, the scattering

shot remaining in hand ever since without apparent disability. Injury to wrist occurred four months ago. By August Schmidt, M. D., 2105 South Broadway, St. Louis, Mo.

Dr. Burton Ward, according to the *Medical Age*, declares that there is one infallible symptom indicating whether one is sane or not. Let a person speak ever so rationally and act ever so sedately, if his or her thumbs remain inactive there is no doubt of insanity. Lunatics seldom use their thumbs in writing, drawing or saluting.

WAVE LENGTH OF ROENTGEN RAYS.

Practically all the results of experiment have so far pointed to the truth of the hypothesis that Roentgen rays differ from ordinary light rays and other manifestations of radiant energy only in the item of wave length. The supposition that they are radiations of almost inconceivable frequency of vibration and having a wave length many times less than that of violent light is a competent explanation of most of the phenomena due to them, leaving their remarkable action in discharging electrified bodies and certain others as yet dimly comprehended actions for further explanation. These, however, do not seem inconsistent with the theory that the Roentgen ray is simply an ordinary transverse ether vibration of high frequency.

In another column is a translation in abstract of a recent article by Mr. J. Precht, giving an account of some experiments with cathode and Roentgen rays. Three different determinations of the wave length of the Roentgen rays resulted in widely varying figures, the lowest wave length found being 0.00016 millimetre. The result of the experiments, assuming that they are all entitled to equal weight in consideration, simply leads to the negative conclusion that the wave-length measurements obtained by them are entirely indeterminate. If the assumption is permitted that the wave length of Roentgen rays is so small as to be comparable to molecular sizes, it can be readily seen from physical considerations that the phenomena of refraction and diffraction would not manifest themselves or at least not in the manner with which we are accustomed; and that no surface would give such reflection as may be had with ordinary light waves, but rather that each surface upon which Roentgen rays impinge would become a new source of diffused radiation of the same character. It seems that no method of wave-length measurement that has been utilized for the determination of the elements of wave motion of ordinary light would be satisfactory for the determination of these incomparably finer vibrations, and that the grossness of structure, even of such bodies as we are accustomed to consider as having high refractive indices, will probably permit these rays to go through them in much the same fashion that a light ray shines through a swarm of flies.

MR. GLADSTONE AND VARIED EXERCISE.—Mr. Gladstone is noted for his outdoor life, and his enjoyment in felling trees in Hawarden Park. When asked the secret of his vigorous health at eighty-three, he replied: "There was once a road leading out of London on which more horses died than on any other, and an inquiry revealed the fact that it was perfectly level. Consequently the animals, in travelling over it, used only one set of muscles. Continuous employment of the same physical powers on the same lines, result in physical exhaustion. It is varied and symmetrical exercise of the mind and all the muscles that lie at the base of any sound system of physical training.—*Modern Medical Science.*

SHE WAS BADLY DISABLED.—A Lawyer having some papers to be executed by an old Irishwoman went to her house one morning for her signature. On his arrival he requested her to sign her name "here," indicating the spot.

"Och," said she, with a bland smile, "you sign it for me, for sure, since I lost me glasses I can't write."

"Well, how do you spell your name, Mrs. S.?"

"Martha dear," she cried, come here directly and shpell me name for this gintleman, for sure, since I lost me teeth I can't shpell a word."

It will be observed that the x-ray portrait No. 1. herein reproduced from Vol. 1, No. 3, of THE AMERICAN X-RAY JOURNAL, is quite free from shadows or evidence of clothing having been worn by the subject at the time the picture was taken, except the shoes. The subject is a woman thirty years of age. The picture was taken in full dress.

The x-ray portrait No. 2, reproduced from No. 5, Vol. 1, of the same journal is of a man thirty years of age with his usual dress. It will be seen that the clothing shows clearly. The cloth in the pantaloons, lining in the same, the shoe tops, the muscles and bone are all seen overlaying one after another in the same plane. No. 2 is a composite picture and the human frame is about as clear in this as in No. 1.

The American X-Ray Publishing Co. offers a Premium of $10.00 for the most instructive article explaining the reasons for the difference in appearance of the two radiographs.

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NO 1.

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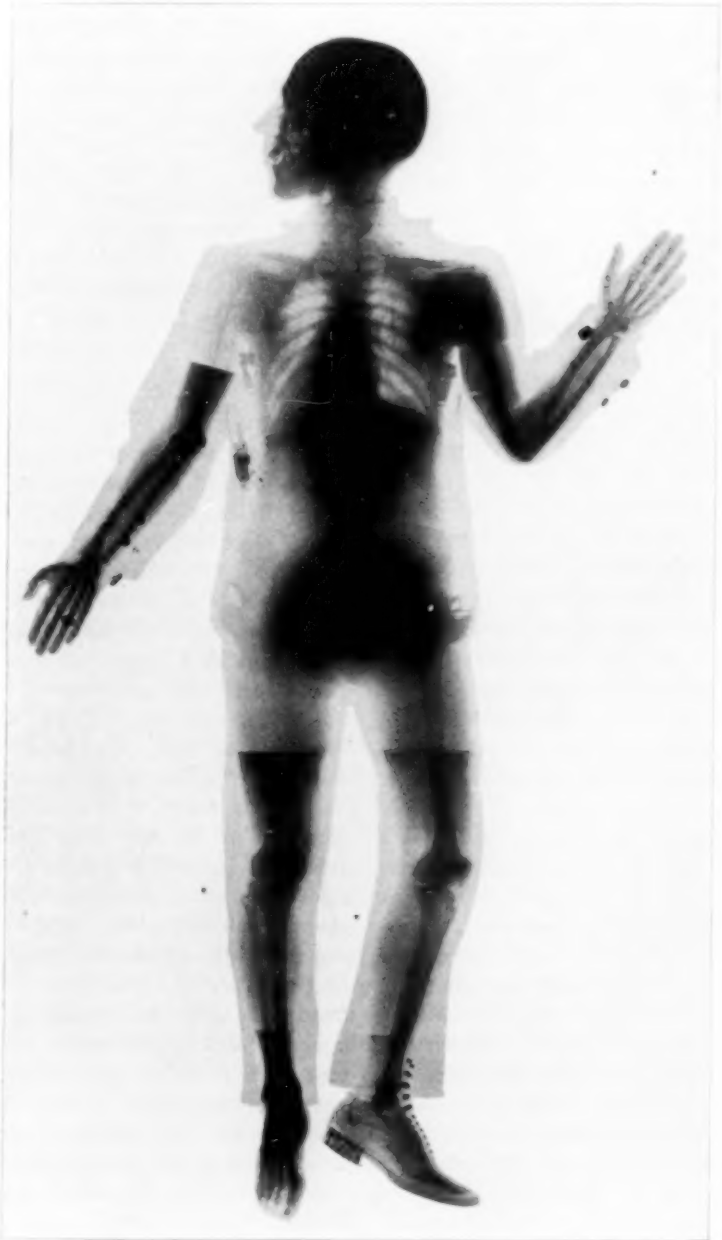
The awarding committee will consist of three well known x-ray experts.

It is desired that the communication be sent in early as convenient. If contributors so request, all manuscript, except the successful article, will be returned, provided the necessary stamps accompany it.



NO. 2.

X-RAY THIRTY MILES FROM R. R.

EDITOR OF THE AMERICAN X-RAY JOURNAL:

Popular curiosity regarding the x-rays seems to have grown with wonderful pace. From reading I would judge that the only stony ground on which the seed has fallen is amongst those who have gotten hold of poor machines. Even the busy country doctor does not lose sight of a scientific discovery which has accomplished so much in a single year. Thirty-five miles from a railroad and the busy marts he has no opportunity to witness the wonderful search-light of the Fluoroscope and Crookes' tubes. In his rounds he finds some cases difficult of diagnosing and is led to wonder if these penetrating rays would aid him. There seems to be several different kinds of rays; the Cathode, Leonard, Rayons Wrainques, by H. Bicquerell, glow-worm rays and the rays emitted by fluorescence. No doubt under influence of higher vacuum or other improvements greater results remain to develop.

With the fluoroscope it seems that every part of the human body can be seen. Yet we have doctors, some old and some just from college who do not believe this. Thus it is seen that "Thomas" remains.

Since the discovery of x-rays they have been applied in nearly every existing art and science. To one who like the writer has never seen a fluoroscope or Crooke's tube, the wonder is, what will next be the result of investigation along this line? Will it be made to penetrate fossil remains? Will it yet be intensified in focus and vacuum until the bowels of mother earth will show up as it does the human brain. Perchance some long range method will be found to cast a search light that will show up the starry canopy. We do not know but that treasures on both land and sea may be equally revealed. We are yet infants in the domain of science.

The x-ray has become a potent factor for every physician who can use it and will be true to his patients. It is not a Koch lymph, an elixir of life or a blue glass fad. J. C. EMMONS, M. D.

Scotland, Ark., Oct., 1897.

The editor of this journal would like brother Emmons to know that perfectly efficient x-ray apparatus, practical for all medical and surgical purposes, can be had without the use of city electric currents, dynamos, storage batteries, or cells dry or fluid. X-ray apparatus are now constructed so that they can be used thirty-five miles from a railroad and at the cross road, with proficiency and he who will can become practically learned as those in the "busy marts."

We appreciate Dr. Emmons' letter and invite others to write.

LIVE FROGS AS AN ANTITHERMIC.—An English practitioner of Constanta, Roumania, writes: On the evening of October 19, I was called to visit a Roumanian boy, 6 years old, suffering from typhoid fever. I found him *in extremis*, almost pulseless. The child's head was completely wrapped over with a large white sheet, and as I looked at it this enormous white envelope seemed to be on the move, and while I was surveying this covering there crept from under it a small frog, which quietly sat over the child's left arm. It seemed quite content. I immediately called the mother's attention to it and requested her to take the animal away, thinking it had crept there as an intruder. "Oh, no!" said the old lady, "a doctor recommended that a lot of them should be kept to the head to keep it cool." Seeing the head covering still on the move, I raised it for curiosity, and in a second out jumped about twenty other frogs and hopped away in all directions. I have often heard the expression "as cold as a frog," but this was the first time I had seen a frog applied as a head-cooler."—*London Lancet.*

SOCIETY PROCEEDINGS.

CHICAGO OPHTHALMOLOGICAL AND OTOLOGICAL SOCIETY.

Dr. Starkey opened a discussion on the use of x rays in ophthalmology, as follows: We all know that certain substances which are transparent, or nearly so, to ordinary light, are opaque to the x-rays, and *per contra* certain substances opaque to ordinary light are more or less transparent to the x-ray. In general, it may be said that the greater the density of the object, the greater its opacity to the x-ray, and it may also be said that the higher the vacuum tube the more transparent are bodies to the x-ray. Starting with this knowledge we can readily see that pieces of metal will cause a denser shade from the x-ray than bones, if a sufficiently high vacuum is used.

As far as I am aware, the case I shall report is the first one ever successfully skiagraphed in Chicago as to the location of a foreign body in the eye. It can be seen that it is necessary in the majority of instances that the skiagraph should be taken from two positions, from the side of the head and from the front, and by means of those two skiagraphs the body can often be definitely located. Dr. Sweet, of Philadelphia has invented a plate holder and indicator which I had hoped to show, but am not able to do so.

The first patient is a male thirty-one years of age, who was struck in the left eye on June 28 with a piece of metal. He was seen the next day, when the lens was found opaque so that nothing could be seen within the eye. The eye quieted down and he was discharged from the hospital, but in August the eye began to soften and it appeared that it was going to be destroyed. On August 20 a skiagraph was taken and it showed definitely that he had a large piece of metal in the eye. An attempt was made to extract the bit of iron with a strong electro-magnet, but was unsuccessful and the eye was removed.

The second case was seen October 28, male, struck in the eye with a piece of metal. A hole in the cornea, and iris and lens opaque. The next morning a skiagraph was taken, which showed the presence of a foreign body in the eye. An unsuccessful attempt was made to remove the steel, although it was only forty-eight hours after the accident. The eye was removed and a piece of steel imbedded in the blood clot, so that a magnet could not affect it much.

Dr. Starkey showed many interesting skiagraphs of the bones of the head and of foreign bodies in different parts of the body.

DISCUSSION.

DR. CASEY A. WOOD.—Two or three weeks ago a man appeared in my office with, presumably, a foreign body in his eye, but the patient refused to have a skiagraph taken because he feared untoward results. It certainly looks as if with improved methods and short exposures we may expect some benefit from the use of the x-ray in ophthalmology in the future.

DR. HALE—My experience, which is limited to one case, has been very disappointing, but I am also inclined to think that it was due to imperfect apparatus.

DR. STARKEY, in closing, said that the exposure is never longer than eight minutes with the proper vacuum tube.

ELECTRICAL PHENOMENA IN THE SAHARA.— COURMELLES.— L'ECLAIRAGE ELEC., Dec. 25.—A brief abstract of a paper read at the French association for the Advancement of Science. He attributes the electric manifestation noticed in that desert and the production of ozone to the friction of the particles of sand raised by the wind, and the medical effects of the station at Biskra to this phenomena.

HOW THE SURGEON LOST HIS FEE.

A famous Vienna surgeon was asked, by telegraph, how much he would charge for a capital operation on Reb Chaim Rosenbaum, a young, promising merchant in darkest Polish-Russia. The reply was that 5,000 gulden ($2,000) would be a fair compensation for the job. After various negotiations it was agreed that the desired amount should be paid after the operation was performed. The surgeon left sunny Vienna at once to emerge, after a thirty-six hour's journey, in the garlicky atmosphere of a small Polish town. There he was met by a congregation of long-bearded and long-coated individuals with long faces, who explained that the life-saving professor was too late this time and that good Reb Chaim Rosenbaum was gathered to his fathers the previous night. The surgeon's disappointment was so much greater as the mourning survivors did not show any willingness to pay his expenses. He concluded, however, to take a day off in the town. The population heard of the presence of the celebrated surgeon and it was not long before he saw himself surrounded by a crowd of surgical cases. He was kept busy operating the whole day, receiving fees of 50 to 100 gulden from each patient, so that, while not getting the stipulated 5,000, his trip was not a dead loss. When on the following day he was entering his train to return to Vienna, an old Polish gentleman most politely approached the professor, wishing him a lot of good things, praising his skill and many virtues, and finally saying that the whole town was forever under deep obligations to him, and to show his everlasting gratitude he would confide a secret to him. The professor could do no better than to listen and great was his surprise when he heard the following confession: "Don't you know, dear professor, that there is some mistake about Reb Chaim Rosenbaum's premature end and that in fact he found it preferable to stay with us instead of being gathered to his fathers. Among the many patients you operated upon yesterday you also operated upon Reb Chaim Rosenbaum, and God bless you, you were satisfied to take 50 gulden instead of 5,000. Thanks to Heaven and to the greatest of all great professors, he is on the road to recovery. Great is your kindness and great is Allah!" The professor made an unsuccessful effort to smile, the locomotive began to puff, and when next he goes to Rosenbaum's town, without a payment in advance, may we be there to see —*Clinical Recorder.*

DEATH RATE AMONG PHYSICIANS.

This interesting question has been raised by a communication to the Brooklyn *Medical Journal* by Dr. Kortright. The death record given is of four hundred and fifty-eight medical men who departed this life in New York and Brooklyn during the past eight years. It shows the average life of the decedents to have been 54.6 years, and the mortality 25.53 per cent—a mortality exceeded only among saloon-keepers, butchers, quarrymen and poor factory operatives. The death rate among clergymen is only 15.93, and among lawyers, 20.33. It thus appears that the practice of medicine is more hazardous than that of any of the other learned professions The ailment which claimed most of the victims, according to Dr. Kortright, is the pathological condition which obtains in the group of affections classed as Bright's disease, viz.: arterial sclerosis and degeneration of the muscular fibres. This condition is responsible for 35 per cent of the deaths among doctors. This showing agrees with that made by English statistics. The cause is found in the vicissitudes to which the general practitioner is of

necessity subjected—the loss of sleep, exposure to the inclemencies of the weather, irregularities of meals, overwork, mental anxiety, etc. The constant variation of the tension of the arteries from such causes results in fibrinous deposits and inflammatory changes involving the kidneys as well as the heart and arteries. Poisoning and starvation of the tissue involved, through necessarily consequent defects of elimination, soon manifest themselves. The step is short to changes in the specific gravity of the blood from retained products of metabolism and pathologic conditions expressed in the term arteriosclerosis.

UNITED STATES CONSUL CHILDS has informed the State Department that an electric light plant has been established in Ch'ang Sha, capital of the most exclusive and hostile province in China, where, a few years since, the people refused to allow telegraph poles to be erected. A native company has been organized to light the city with electricity, and it will only be a short time before it will be under way, as most of the capital has been subscribed. The consul states that the public buildings will be electrically lighted, and that prejudice is giving way to the modern invention.

THE DYEA-KLONDIKE TRANSPORTATION COMPANY'S aerial tramway over the Chilkoot Pass, Alaska, referred to in the last issue of *The Electrical World*, will be operated at first by a temporary steam plant, in Dyea, driving a Westinghouse two-phase 45-kw generator. The current will be transmitted 20 miles by the Scott system, and will actuate electric drums near the summit of the pass. There will be about 6900 feet of Telfer-system aerial tramway, constructed, probably, in two sections. Mr. W. A. Burkholder expects to spend three months in installing the system.

X-RAY BLINDNESS.

BY ERNEST B. SANGREE A. M., M. D.,
Professor of Pathology and Bacteriology in the Medical Department of the Vanderbilt University, Nashville Tenn.

The late Centennial Exposition in this city is, so far as I know, the first very large exposition at which x-ray machines have been exhibited, and it has thus happened that probably a great many more people of all grades have looked through the screens here than have ever before done so in the same space of time.

A gentleman of much more than average intelligence and of considerable knowledge of electrical phenomena presided over one of the machines and he told me that out of about thirty-five hundred persons who looked through the screen, four failed to see anything—not only could they not see the bones of the hand, coins in a book, and the like, but they were not even able to see any light in the screen—it was as dark to them after the current had been turned on as before.

Two of these individuals he had come back and try again at night, and he experimented with them in every way he could devise, but all to no avail; they were unable to distinguish anything.

Though I believe no one has mentioned such a condition as blindness to the x-rays, it is not strange that such a condition should exist. Indeed the fact of color blindness would rather lead us to look for some whose eyes would not respond to the special vibrations set up by the x-ray apparatus. The gentleman to whom I allude was not the only one to notice this peculiarity; for several others in charge of machines, said, in response to his remarking this, that they had also occasionally run across people of the same kind and that it was of no use to try to make them see, for it was impossible.

LEGAL NOTES.

WANTED THE MORTGAGE FIRST.—A Swede came into a lawyer's office one day and asked: "Is hare ben a lawyer's place?" "Yes, I'm a lawyer." "Well, Maister lawyer, I tank I shall have a paper made." "What kind of a paper do you want?" "Well I tank I shall have a mortgage. You see, I buy me a piece of land from Nels Peterson, and I want a mortgage on it." "Oh, no. You don't want a mortgage; what you want is a deed." "No, maister: I tank I want a mortgage. You see, I buy me two pieces of land before, and I got deed for dem, and 'nother faller come along with mortgage and take the land; so I tank I better get mortgage this time."

AN IMPORTANT CIVIL SERVICE DECISION.—Judge John H. Rogers of the Federal Court, Fort Smith, Ark., handed down an important decision last week in the case of W. J. Fleming against S. F. Stahl. Mr. Fleming was an office Deputy under former Marshal J. G. Crump. Mr. Stahl was appointed by President McKinley to succeed Mr. Crump. He undertook to remove Deputy Fleming, and the latter brought suit to restrain him, alleging in his bill that the position of Deputy United States Marshal was, by order of President Cleveland, placed upon the qualified civil service list, and that his removal was about to be made because he was a Democrat.

The decision was rendered on a demurrer to the bill. The Court held that it had no jurisdiction to restrain a removal upon the facts stated in the bill. In regard to the effect of the order of the President by which the office of Deputy Marshal was placed in the classified civil service, the Court said:

"The civil service law never contemplated that the President or the Commission or both could make any rule or regulation which could have the force and effect of law. True, the President may make rules and regulations administrative in their nature which would govern the policy of his administration, and he could enforce the same by the removal of any person from office who refused to abide thereby, but they could not have the force and effect of law nor would the Courts enforce them. Such rules and regulations are purely administrative and may be altered, amended or approved by the President at any time or by his successor in office."

The injunction was dissolved and the bill dismissed at the cost of the Plaintiff.—*Chicago Law Journal.*

Medical examiners of U. S. Pension Boards are effected by this decision. —Ed.

THREE THOUSAND DOLLARS FOR A SPRAINED ANKLE.—At first thought, the supreme court of Minnesota says, it would seem that $3,000 for what counsel called "a sprained ankle" was much too large. But it believes that "sprains" may often be much more serious than broken bones, and it holds that the evidence in the recent case of Christian v. the City of Minneapolis justified a verdict of $3,000 for the so-called "sprained ankle," and that the damages awarded were not so excessive that it would be warranted in disturbing the verdict.

X-RAYS IN FEDERAL COURT.—The Roentgen, or x-ray photograph was declared by Judge Seaman in the United States Court competent as evidence in the recent suit of Patrick Shea against the owners of the steamer Osceola for damages for personal injuries. After the physician, who treated Shea, gave expert testimony as to the present condition of the plaintiff, Shea had himself photographed according to the Roentgen process. The photographs were shown in Court, and they corroborated the testimony given by the expert.—*Chicago Law Journal.*

CONDENSED X-RAX INFORMATION.

SWITCH FOR X RAY WORK.—KOLLE.—ELEC. ENG. Dec. 9.—An illustrated description of a double switch by means of which the motor circuit is closed first and that of the primary coil later, the circuits being opened in the reverse order.

PHYSIOLOGICAL EFFECTS OF X-RAYS.—BALTHAZARD.—REV. GN. DEES SCIENCES, Nov. 30.—A short article, in which he endeavors to prove that the physiological action of these rays is much less important than that of the electric radiations which accompany them; in all experiments with x-rays the electric radiations should be excluded by a screen of aluminum.

X-RAYS AND THE TUBERCLE BACILLUS.—POTT.—ELEC. REV., Dec. 8; reprinted from the London *Lancet*.—He gives the results of experiments which were undertaken to ascertain the effect of x-rays on cultivations of the tubercle bacillus, and the conclusions were that they had no effect; he believes that the improved condition of patients who have been submitted to these rays was due to other causes.

THE X-RAY IN CORNEAL OPACITY.—DR. E. BOCK, IN MEMORABILIEN, Feb.—The author says that if letters are painted on a sheet of cardboard, afterward varnished and dusted with powdered metal, or if the letters are made of gold leaf, the Roentgen rays will throw their shadow through the opaque cornea; and if the optic nerve is healthy, the blind person will see the shadowgraph thrown on the retina. Prof. Eder, of Vienna, has verified these experiments.

PHOSPHORESCENCE BY ELECTRIFICATION. TROWBRIDGE AND BURBANK. *Am. Jour. of Sc*, Jan.—A short article, in which they endeavor to verify by means of phosphorescence the statements that x-rays communicate an electric charge to bodies. They believe that it is not inconsistent with the electromagnetic theory of light to conclude that the phosphorescence excited by sunlight or daylight is due to "an electrical condition which can be dissipated by heat." phosphorescence may be an evidence of the electrical stresses which produce the phenomena of ultra violet light.

X-RAY TUBES.—ROLLINS.—ELEC REV., Dec. 15.—A short description of his tube, in which there is a movable anticathode secured to an iron ring which may be moved in the tube by means of a magnet on the outside so as to put it into the best possible position; the tube can not be transported. In two other short notes by the same author he considers it probable that one cause of the rise in the vacuum in x-ray tubes is that particles of the platinum leave the anode and carry the molecules of the gas against the glass, where they remain; he also believes that the angle of the lines of force with the surface of the cathode depends on the degree of vacuum in the tube.

HEART CHANGES OBSERVED BY X-RAYS.—BY THEODORE SCHOTT, M. D.—DEUTSCHE MED. WOCH., April 1, 1897.—Not entirely satisfied with the results of percussion and palpation, the author, in order to demonstrate the diminution that takes place in the size of the heart after treatment with cool saline baths and passive gymnastics, has undertaken to photograph a number of cases with the Roentgen rays. The vacuum tube is always placed at a certain distance from the patient, and it is possible therefore to express the result in centimetres. Unfortunately, the shadows of the sternum and the vertical column prevent the measurement of the vertical diameter. In two cases, one a boy of eight and one-half years suffering from insufficiency of the mitral valve, the greatest transverse diameter of the heart diminished

from 12.3 cm. to 11.2 after passive movements. The other, a girl of fourteen, remained for ten minutes in a saline bath at a temperature of 31 deg. The greatest diameter diminished in this case from 11.1 cm. to 10.3 cm.—SAILER, in *International Medical Magazine.*

ROENTGEN-RAY NOTES. ROLLINS. *Elec. Rev.*, Jan. 5.—A continuation of his notes. In order to see through greater thicknesses, and yet have marked contrast, he recommends raising the amperage, thus keeping the wave length unchanged, but increasing the amount of light, which does not change the relative transparency very much; he endeavors to show why there is a change in the relative transparencies; for greater details in the bones waves of shorter wave lengths are required. He also found no reason why a brass anode should not be used instead of the more expensive platinum. He found that the burning from vacuum tubes not generating x-rays may be severe, the tube being exhausted to such a degree that no Roentgen light could be produced with the voltage used.

SELF-REGULATING X-RAY TUBE.—ELEC. ENG., Dec, 16.—An illustrated description of Rice's modification. A well-known system of regulation is in use, in which there is a spark gap shunting the tube, in series with which gap there is a small tube containing the usual volatile salt; the objection to this is that the spark is annoying, that the regulation produces a flickering, and that the sparks sometimes partially short circuit the tube. In the present arrangement the shunt spark gap is replaced by a long tube containing water, the resistance of which is very high; a shunt current passes through this continuously; otherwise the arrangement is similar to the well-known one. He found that a tube three thirty-seconds of an inch inside diameter and about two feet long, filled with water, affords the proper amount of resistance.

ACTION OF ROENTGEN RAYS ON PLANTS. ATKINSON. *Science*, Jan. 7.—A description of some extensive preliminary experiments to determine what lines of investigations might be profitably carried on in order to find what influence, if any, the Roentgen rays would exercise on plants as a possible stimulant. An illustration is given of an ordinary and a Roentgen ray photograph of part of a plant. He found that plant tissues absorb the Roentgen rays quite freely, and was surprised to find that there was not a more marked influence on growing plants, and especially that there are no visible external injuries even when they are exposed to close range a large part of the time during several days. No other general conclusions appear to be drawn.

X-RAYS AND MINERAL PHOSPHORESCENCE. BURBANK. *Am. Jour. of Sc.* Jan.—A short article describing experiments with fluorescent minerals under the action of the rays. Fluorite phosphoresces with a bluish white light which continues for a very long time afterwards; it is sometimes used below the photographic plate in radiography to increase the effect, but it unfortunately fogs the plate and blurs the outlines. Many minerals were tried, and more than two-thirds were found to phosphoresce, those containing calcium being the most susceptible, and in general those containing the ores of the metals being non-phosphorescent; with calcite the effect of heat is to greatly brighten the light emitted; with other crystals heat sometimes increased, sometimes diminished, and in several cases did not affect the light.

ROENTGEN RAYS. ROLLINS. *Elec. Rev.*, Jan. 12.—A continuation of his notes. He gives the reasons why Leonard's x-rays were feeble. In discussing the question whether the cathode stream

goes forward in a high vacuum, he states that with the degree of vacuum used in producing Roentgen rays the position of the anode in relation to the cathode may be of importance. In discussing the question whether the Roentgen rays are strongest when the anode is the source, he states that if the target for the cathode discharge is in line between the cathode and the anode it need not be an anode and with powerful generators it is better not to have the target the anode, as a cold target not in circuit does not blacken the tube as quickly as when it has the function of the anode; he also shows that there are two sources of Roentgen rays in every tube.

VOLTAGE OF SPARK DISCHARGES. TROWBRIDGE. *Am. Jour. of Sc.*, Jan.—A short article on E. M. F., in which he gives the results of experiments made with his improved Plante rheostatic machine with sixty condensers and a 20,000 volt accumulator, thus giving 1,200,000 volts; with this he investigated the conditions necessary to produce a spark of great body, 48 to 50 inches in length; the length corresponding to the latter voltage is 48 inches. E. Thomson, with transformers sparking 50 to 60 inches, estimated that the voltage necessary to produce a spark of 80 cm was 500,000; the present writer believes this is nearer the truth than the 100,000 claimed by Heydweiler. The results show that Lord Kelvin's conjecture that the electrostatic force necessary to produce a spark in air "remains sensibly constant for all distances" beyond the limit he described is correct, for when the length of spark is plotted as abscissas and the corresponding voltages as ordinates a straight line is obtained. The rheostatic machine is much more efficient than the transformers for such high voltages; with the former one-third of a horse-power will produce the effects which heretofore required from 30 to 40 horse-power; the method of charging and discharging the condensers was to use lever arms instead of rotary cylinders, thus securing greater uniformity of action. He also tried the discharge through Crookes' tubes, one of which was exhausted so that an 8-inch spark preferred to pass through the air; the discharge produced by the machine passed readily through the tube, producing brilliant x-rays and the degree of rarefaction of the tube was not sensibly affected by single discharges. The results so far obtained show that the length of the spark is proportional to the voltage, and that rarefied spaces hitherto considered to have too high a vacuum to conduct electricity cease to act like such a vacuum to these very high voltages.

STRONG JOURNALISM.—Evidence of strong journalism is measured by the influence it wields amongst its readers. The Medical Brief enjoys the distinction of having the largest circulation of any medical monthly published in this or any other country. Its veteran editor and owner, Dr. J. J. Lawrence, ripe with experience, full of technical learning and withal a determined mind, advocated his views in the pages of his journal, upon the financial system of the country; and with amazing boldness in the face of statistics and argument, urged a protest gainst the medical use of certain animal products. Scarcely another publication could have so successfully waged a siege to the extent at least of eliciting inquiry into the truth.

DR. NICHOLAS SENN, of Chicago, it is said, was recently arrested and taken to Galena, Ill., by a constable. He was summoned to testify in a case, but telegraphed that he was unable to leave his practice, whereat a writ was served on him for contempt of court. When he appeared the judge accepted his excuse as a well-grounded one and imposed no fine.—*Philadelphia Med. Journal.*

CAMPHO-PHENIQUE POWDER.

The following article, showing the value of Campho-Phenique Powder as a dressing, in crushed and comminuted wounds of the muscles, by H. L. Gault, M. D., Surgeon of Chester and Centralia Railroad, Sparta, Illinois, appeared in May number of Kansas City "Medical Index:"

"The following little report is given to brother physicians to illustrate how easy it now is to get splendid results and quick recoveries in a class of injuries which, up to a few years ago, were justly regarded with dismay and dispair by almost all practitioners and surgeons—injuries in which the crushing force of machinery has reduced muscles to almost a pulp, beside bruising the periosteum, if not cracking the bones. A. B., a railroad employee, came to me a short time ago, with the hand in the condition described; two of the fingers were ground almost to tatters. On first looking at them my impulse was to amputate them at once, but having had considerable experience in that class of cases, I proceeded slowly and carefully to approximate the bits of muscle that hung together, and finally got them into some sort of shape. I then dusted them plentifully with CAMPHO-PHENIQUE POWDER, covered them with a bandage, also thoroughly impregnated with the powder, and sent the patient home. On the ensuing day, finding no suppuration, and the patient in no-wise suffering, the dressing was left intact. It is scarcely necessary to go into further details. The same dressing and the same treatment was maintained throughout, recovery being rapid and perfect. At no time, from first to last, was there anything but healthy pus, and but little of that. There was absolutely no odor, and no pain after the first dressing.

Regarding the antiseptic and vulnerary used, I will say that as a dry dressing I have never yet seen anything equal to CAMPHO-PHENIQUE POWDER. I am in constant employment of CAMPHO-PHENIQUE, both in its original, liquid form, and in the powder, and I can not say too much for it, especially in the latter shape."

JOURNALISM IN THE KLONDIKE.—The *Midnight Sun* is the name of an enterprising newspaper printed in Dawson City. The editor thereof is looking forward with much anticipation, to the time when wireless telegraphy will be an accomplished fact, and he is already making preparations to avail of its advantages in behalf of his publication. He is, according to an editorial in our sprightly contemporary, "fixing up" a receiving station on his roof garden to catch all the late news that may float in the upper air currents. These waves of intelligence he says will probably have to be thawed out before they can be deciphered, but he has provided for such an emergency, by connecting a hot-air cylinder with his receiving apparatus. "No expense will be spared," he remarks with enthusiasm, "to make the *Midnight Sun* the finest example of advanced journalism north of Galveston."

APPENDICITIS.—Dr. Pepper states that in appendicitis, in spite of the claims to the contrary, twenty cases to one are cured permanently without operation. The University of Pennsylvania is efficiently equipped with X-Ray apparatus, an Institution in which Professor Pepper is an honored teacher.

BOOK REVIEW.

The Treatment of Disease by Electric Currents.

BY S. H. MONELL, M. D.,

Author of "Manual of Static Electricity," Founder and Chief Instructor of the Brooklyn Post-Graduate School of Clinical Therapeutics, and Roentgen Photography; Fellow of the New York Academy of Medicine. William Borts Hanna, N. Y. 1130 pages, $7.50, net.

We find in this volume a condensation of facts which physicians have long sought in vain.

In the hands of expert operators electric currents have been for a long time used with success for the treatment of disease, and with such startling results in many instances that learned professors in medical therapeutics, have reflected doubt upon the correctness of the reports and thereby biased young practitioners from the use of electro-therapeutics. Again, success in the hands of the few has spread apace the knowledge which has allured the untaught who, hoping for like good results, purchase apparatus that are worthless for medical purposes and therefore fail utterly.

Dr. Monell has cleared away in a few pages the perplexities that have befogged the source of knowledge. The quibbles, the confusion, the vague meanings which have hitherto characterized electro-therapeutic literature are here wholly unmasked—the subject being treated with the plainness of the Anglo-Saxon tongue.

The book abounds in common-place similes which are used for the purpose of imparting accurate meaning and setting aside all ambiguity and doubt. In every paragraph the reader finds something new and so easily does he grasp the thoughts that with hours of reading he does not tire.

The author betrays a familiarity with the subject not equally enjoyed by any other writer. The writing is essentially Monell. Every sentence bristles with the evidence of self conviction won by labor, experience and thought. His language is simple, pure and rich. Upon one page we found more than 175 variable words.

Many medical authors writing upon questions peculiar to their practice have been enthusiastic in their opinions, but at the same time displayed an incautious tendency to frown upon the results claimed by electro-therapeutic writers. Recent writers upon electricity, have properly conceded to medicine the place it occupies in therapeutics. The "over enthusiastic claims of electro-therapeutic advocates" can be no longer justly written. This book marks an essential feature in that it makes no claim whatever in its teachings, but simply states the demonstrated action of electricity.

Medical men can find in this book all that they need of the physics and physiology of galvanic, faradic and static currents. The author has simplified the method of teaching by a clinical course. Individual cases including almost the domain of pathology are used subjectively. How to obtain the current, the nature of current, the pole used, duration of each seance, changes to be looked for and all practical methods are taught with the conviction of pure clinical teaching.

The book is divided into 70 chapters, several of which are devoted to pelvic disorders of women. The bipolar method for relieving pain in this situation and the clear practical course adopted for curative treatment with electrical currents appeals to the understanding of every reader. The force of this observation culminates on page 398 in the following: "When structural changes have occurred the prognosis is affected rather than the method of treatment, the differences in the latter consisting chiefly in selecting the pole (either positive or negative) which conforms to the indications present. In one way or another almost all these cases, even those which have been sent by thousands to the operating table can be either entirely cured or given symptomatic relief by the persistent use of conservative electrical methods, and the number who will find no relief except by the removal of the diseased organs is so small that the physician in ordinary practice can not compute the vanishing percentage."

The chapter devoted to "Urethral Strictures" details plainly the method for treating certain cases successfully where the modern and successful practice of divulsing urethrotomy has exceptions. This teaching must arouse the attention of all genito-urinary surgeons.

The subject of "Pain" treated by electricity for cure or palliation must engross the attention of every practitioner. The resources of medical electricity for this purpose are many. While its advantage is superior in most cases to anodynes Monell says, "It also imparts a general neutritional benefit".

The book is essentially practical for the doctor and should be studied until he becomes familiar with every detail. The index is alphabetically arranged and is full and complete.

The volume was given to the profession just at the time it was most needed. This is the beginning of the electrical age in which electro-therapeutics is making such conquering advance. This book is an index of the progress of the medical profession.

AN ELECTRIC MAIL WAGON.—The British Post Office has had on trial in London an electrically driven van for the carrying of mail matter between the main office and sub-stations. The experiment at the start seems to be successful.—*Electric World.*

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